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**TTO NITRIDE LINER FOR IMPROVED
COLLAR PROTECTION AND TTO RELIABILITY**

ABSTRACT OF THE DISCLOSURE

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10 A structure and method which enables the deposit of a thin nitride liner just before
Trench Top Oxide TTO (High Density Plasma) HDP deposition during the formation of a
vertical MOSFET DRAM cell device. This liner is subsequently removed after TTO
sidewall etch. One function of this liner is to protect the collar oxide from being etched
during the TTO oxide sidewall etch and generally provides lateral etch protection which
is not realized in the current processing scheme. The process sequence does not rely on
previously deposited films for collar protection, and decouples TTO sidewall etch
protection from previous processing steps to provide additional process flexibility, such
as allowing a thinner strap Cut Mask nitride and greater nitride etching during node
nitride removal and buried strap nitrated interface removal. Advantageously, the
presence of the nitride liner beneath the TTO reduces possibility of TTO dielectric
breakdown between the gate and capacitor node electrode of the vertical MOSFET
DRAM cell, while assuring strap diffusion to gate conductor overlap.